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BOOK REVIEWS.

VORTRÄGE ÜBER DIE DESZEDENZTHEORIE. Gehalten an der Universität zu Freiburg im Breisgau von *August Weismann*. Zweite, verbesserte Auflage. 2 Vols. in 1. Jena: Gustav Fischer. 1904. Pp. xiii, 340; v, 344.

Professor Weismann's *Theory of Descent*, which is a carefully revised report of lectures actually delivered at the University of Freiburg i. B., is intended by its distinguished author to be a résumé of his life's work, and we are glad to notice that within a short time it has already reached the second edition. He calls it his *Hauptergebnisse*, the chief results of his labors, and it constitutes a condensed statement of his theory on heredity.

Professor Weismann was one of the first among the naturalists of Germany to indorse Darwin's views, for which he made a strong plea in his inaugural address in 1867; but he thought at the time that Darwin's theories could be enlarged and deepened, and so he worked out his own theory of selection, in which he insisted on the significance of the selection that takes place in the domain of germs. He may be accused of exaggerating the importance of this principle, and of one-sidedness in deriving from it all his explanations. But, he answers, one might as well accuse physicists of one-sidedness when they claim that the law of gravitation is possessed of universality. He says:

"In this application of the principle of selection to all stages of living units, lies the nucleus of my views. To this thought all these lectures lead, and I am convinced that it constitutes the import of this book. It will last even if everything else in the work should prove temporary." In another place he says: "In spite of many contradictions, I take the fundamental ideas of my views to be right, and among them are the propositions of the existence of the determining units of life called determinants, and their combination into ids. Upon the doctrine of determinants rests the theory of germinal selection; and, according to my conviction, without this, the great thought as to the guidance of the transformation process of the forms of life through selection, by discarding the unfit and by favoring the better adapted, will remain a mere torso, a tree without roots."

Whatever may be just in the objection of exaggeration and one-sidedness that is made to Professor Weismann's theory of germinal selection, even his adversaries must admit that he has done good work, and that his investigations have contributed considerably to the progress of our comprehension of the theory of evolution. If we consider all the replies that have been made to Weismann, and if we consider, too, the innumerable new facts brought to light in controversy, partly by himself and partly by his adversaries in their anxiety to refute him, we may fairly say, even from the standpoint of his severest opponents, that the impulse which he has given to science is invaluable.

Within the last two decades biological science has penetrated more deeply into the mysteries of life than ever before, and at this period, Weismann has been the moving spirit, eliciting new data and utilising everything to its best advantage. Naegeli proposed his theory of the idioplasm—that substance which determines the form of a being. Professor Weismann developed this idea by entering into details and showing that such idioplasms should not be sought (as Naegeli wanted) in the body of the whole cell, but in the nucleus which contained all the determinants for the structure of the organism, called by Weismann *Anlagesubstanz*, a word which has caused translators much trouble, and which we will briefly define as the substance which contains a disposition of the organism. Every cell contains its idioplasm which was discovered in a colorable substance, whence the terms chromatin and chromosome. Professor Weismann calls the idioplasm of the germ cell, germ plasm, and any complex of germ plasm which forms a biological unit he calls an "id." Further, chromosomes that contain several ids he calls "idants," the existence of which, although invisible on account of the smallness of the germs, Professor Weismann deems established on account of his observations of the salamander.

From Professor Roux's investigations in regard to the struggle of the parts, we became familiar with the existence of the germ plasm, which is, as it were, a special substance of heredity. Roux discovered it in the chromosome and traced its continuity through generations. We know now the potential immortality which single cells and germ cells possess in contrast to all higher forms of life. We have observed the mitotic division of the nucleus and the actions of the centersphere which constitutes that marvelous organ of division of the cell and allows us to look deeper into the unfathomable mystery of the minute and complicated details in the structure of living cells.

How much more advanced are our views now as to fecundation and the details of that two-fold process, propagation and amphimixis; that is, the mixture which takes place in the fusion of male and female germs. Further, we have new facts as to the phenomena of growth and the significant reduc-

tion of heredity, units of which according to Professor Weismann lead to an abandonment of Lamarck's principle of selection and point out that ultimately selection is a selection of germs.

Although the present work is a defence of Professor Weismann's theory of germinal selection, the nineteen lectures which it contains are by no means polemical. He has avoided all personal expostulations with his adversaries, and has limited himself to plain objective statements of differences. He has not burdened his book with all details of biological facts, because he intended it to be a book to be read, and not an encyclopedia for reference. In spite of his modest intentions, however, the work possesses the stately size of 684 pages, with numerable illustrations in the text, besides colored tables in the Appendix. It is not Weismannism, but an exposition of the theory of descent, which presents each link of the argument in a complete yet popular form from the standpoint of Weismann, who feels confident that if we have to explain the teleology of nature without falling back upon the assumption of teleological forces, his method is the only way to success.

P. C.

ADOLESCENCE: ITS PSYCHOLOGY AND ITS RELATIONS TO PHYSIOLOGY, ANTHROPOLOGY, SOCIOLOGY, SEX, CRIME, RELIGION, AND EDUCATION. By *G. Stanley Hall*. New York: Appleton & Co. 1904. 2 Vols. Pp. xx, 589, 784.

Dr. G. Stanley Hall, the President of Clark University, is rightly deemed one of the foremost authorities on psychology, and the present work in two stately octavo volumes deals with the practical problems of adolescence in its various aspects, always keeping in mind the need of the teacher, the educator, and also the parent. It is scarcely possible to exhaust this important book in one review, and we do not mean to attempt it here. We venture only to characterise its contents and thus allow our reader to form a judgment of his own. In one passage of the preface the author says:

"The book attempts a pretty full survey of pedagogic matter and method for the age treated, and also, to some extent, for earlier and later years. To motor education, grouped under four great divisions, and will-training, one of the longest chapters (III) is devoted. The last part of Chapter XV and Chapter XVI treats of the pedagogy of the English literature and language, history, drawing, normal and high schools, colleges and universities, and philosophy, and Chapter XII is devoted to that of nature and the sciences most commonly taught. Menstruation and the education of girls occupies two chapters (VII and XVII), hygiene, crime, and secret vice one each (IV, V, VI), social and religious training have each a chapter (XV and XIV, respectively), and the education of the heart is described not only in XI, but in XV, XII, and elsewhere."